FEU06 – SOP for the Examination of Cartridges, Casings, Shotshells, Shotshell Casings, and Associated Components

Table of Contents

1. Scope

1.1. This standard operating procedure is designed for the microscopic examination of cartridge(s), cartridge case(s), shotshell(s) and shotshell case(s), including but not limited to the examination and comparisons of ammunition components to firearm(s).

2. Background

2.1. To establish the practices for documenting the examination of firearm evidence to conform to the requirements of the Department of Forensic Sciences (DFS) Forensic Science Laboratory (FSL) *Quality Assurance Manual*, the accreditation standards under ISO/IEC 17025:2005, and any supplemental standards.

3. Safety

3.1. For proper handling of firearm see the *FEU01 - SOP for the Safe Handling of Firearms*.
3.2. Protective gloves must be worn when handling cartridge(s), cartridge case(s), shotshell and shotshell cases.

4. Materials Required

4.1. Metal scribe; Stereo zoom binocular microscope; Comparison microscope; Marker; Calipers; Bullet recovery tank; Forensic Buddy Portable bullet recovery system; Indoor range; Inertia bullet puller; Scale; Latex gloves; Eye protection; Ammunition.

5. Standards and Controls

5.1. Known specimens from test fired firearms are control specimens. A control specimen is created during the examination of a functional firearm.

5.2. Standard Ammunition File

6. Calibration

6.1. Not applicable

7. Procedures

7.1. General

7.1.1. Before any examinations are conducted, ensure that the cartridge(s), cartridge case(s), shotshell(s) and shotshell case(s), as well as their containers, have been appropriately labeled with the FEU number, the initials of the FEU member and the item designation.

7.1.2. Care should be taken not to obliterate any identifying marks that remain on the specimens.

7.1.3. Labeling marks are most commonly placed on the sides of the cartridge(s), cartridge case(s), shotshell(s) and shotshell case(s) including, but not limited to, inside the case mouth or on the case body.

7.1.4. Determine and note the physical characteristics of the cartridge case(s). The following information is recorded on the cartridge case worksheet(s):

7.1.4.1. Caliber

7.1.4.2. Brand

7.1.4.3. Case finish

7.1.4.4. Primer finish

7.1.4.5. Cannelure

7.1.4.6. Firing pin shape

7.1.4.7. Breech face

7.1.4.8. Body case marks

7.1.4.9. Magnetic

7.1.4.10. Item number

7.1.5. Determine and note any type of marks on the cartridge(s): The following information is recorded on the cartridge worksheet(s):

7.1.5.1. Caliber

7.1.5.2. Brand.

7.1.5.3. Case finish

7.1.5.4. Primer condition

7.1.5.5. Cannelure

7.1.5.6. Bullet design

7.1.5.7. Body case marks

7.1.5.8. Magnetic

7.1.5.9. Quantity

7.1.5.10. Item number

7.1.6. Determine and note any type of marks on the shotshell(s): The following information is recorded on the shotshell worksheet(s):

7.1.6.1. Item number

7.1.6.2. Gauge

7.1.6.3. Length / design

7.1.6.4. Headstamp

7.1.6.5. Hull material

7.1.6.6. Hull printing

7.1.6.7. Hull color

7.1.6.8. Primer finish

7.1.6.9. Trace material

7.1.6.10. Magnetic

7.1.7. Determine and note any type of marks on the shotshell case(s): The following information is recorded on the shotshell case worksheet(s):

7.1.7.1. Item number

7.1.7.2. Gauge

7.1.7.3. Length / design

7.1.7.4. Printed shot size

7.1.7.5. Headstamp

7.1.7.6. Hull material

7.1.7.7. Hull printing

7.1.7.8. Hull color

7.1.7.9. Base material

7.1.7.10. Primer finish

7.1.7.11. Firing pin shape

7.1.7.12. Firing pin drag

7.1.7.13. Breech face

7.1.7.14. Trace material

7.1.7.15. Magnetic

7.1.8. Determine and note any type of shotshell components: The following information is recorded on the shotshell component worksheet(s):

7.1.8.1. Item number

7.1.8.2. Gauge

7.1.8.3. Shot type

7.1.8.4. Shot size

7.1.8.5. Overpowder wad

7.1.8.6. Spacer wad

7.1.8.7. Combination wad

7.1.8.8. Collar/cup

7.1.8.9. Number of petals

7.1.8.10. Manufacturer

7.1.8.11. Damage

7.2. Microscopic Examination of Cartridge Case(s), Cartridge(s), Shotshell(s) and Shotshell Case(s) with No Firearm Submitted

7.2.1. Microscopically examine and compare the evidence using a comparison microscope. During the microscopic comparison/examination, careful consideration is given to the presence of subclass characteristics. From your comparison/examination, provide your conclusion. Conclusion will reflect one of three possibilities:

7.2.1.1. Identified – marks on the evidence cartridge case(s), shotshell, shotshell case(s) and/or cartridge(s) were produced from the same firearm.

7.2.1.2. Non-Identification – marks on the evidence cartridge case(s), shotshell, shotshell case(s) and/ or cartridge(s) were <u>not</u> produced from the same firearm.

7.2.1.3. Insufficient Markings- marks on the evidence cartridge case(s), shotshell, shotshell case(s) and /or cartridge(s) could not be identified or eliminated as having been produced from the same firearm.

7.3. Microscopic Examination of Cartridge Case(s), Cartridge(s), Shotshell(s) and Shotshell Case(s) with a Firearm Submitted

7.3.1. Obtain like ammunition for test firing of the firearm. Test fire the firearm following the procedures in *FEU04 – SOP Test Fire*.

7.3.2. Place test fired specimens in a designated envelope.

7.3.2.1. Each envelope will be clearly labeled with FEU number, CSIB number, CCN, Item number (*T/F*), Make, Model, Caliber, Serial number, Country, Recovery Date, Tech/Exam, GRC, LIMP/Gimp and stored in numerical order.

7.3.3. Microscopically examine and compare the test fired components to the evidence cartridge case(s) and shotshell case(s) using a comparison microscope. During the microscopic comparison/examination, careful consideration is given to the presence of subclass characteristics. From your examination / comparisons provide your conclusions. Conclusion will reflect one of three possibilities:

7.3.3.1. Identified – marks on the evidence cartridge case(s)/shotshell case(s) were produced from the submitted firearm.

7.3.3.2. Non-Identification – marks on the evidence cartridge case(s)/shotshell case(s) were not produced from the submitted firearm.

7.3.3.3. Insufficient Markings- marks on the evidence cartridge case(s)/shotshell case(s) could not be identified or eliminated as having been produced from the submitted firearm.

8. Sampling

8.1. Not applicable

9. Calculations

9.1. Not applicable

10. Uncertainty of Measurement

10.1. When quantitative results are obtained, and the significance of the value may impact the report, the uncertainty of measurement must be determined. The method used to determine the estimation of uncertainty can be found in the *FSL Quality Assurance Manual – Estimation of Uncertainty of Measurement (Section 5.4.6)* and in the FEU Appendix A, Uncertainty of Measurement Guidelines.

11. Limitations

11.1. If the cartridge(s), cartridge case(s), shotshell(s) and /shotshell case(s) are extremely damaged or mutilated, it may not be possible to determine its manufacturer. Additionally, some specimens may lack microscopic characteristics of value for examination/comparison purposes.

12. Documentation

12.1. Cartridge Case Worksheet
12.2. Cartridge Worksheet
12.3. Shotshell Worksheet
12.4. Shotshell Component Worksheet
12.5. Fired Shotshell Worksheet
12.6. Firearms Worksheet
12.7. Case Review Sheet
12.8. Miscellaneous Worksheet
12.9. Photographs
12.10. FEU Report of Results

13. References

13.1. Mathews, J.H., Firearms Identification, Vols. I-III, Charles C. Thomas, Springfield, IL (1962)

13.2. Gunther, J.D., and Gunther, C.O., The Identification of Firearms, John Wiley, New York (1935)

13.3. DFS Health and Safety Manual (Current Version)

13.4. Forensic Science Laboratory Quality Assurance Manual (Current Version)

13.5. FSL Departmental Operations Manuals (Current Versions)

13.6. FSL Laboratory Operations Manuals (Current Versions)

13.7. FEU01 - SOP for Safe Handling of Firearms (Current version)

13.8. FEU04 – SOP for Performing Test Fires (Current version)

13.9. Cyber National, Inc., Bullet Recovery System & Remote Firing Platform Operating Guide (2004)

13.10. Forensic Buddy, Savage Arms Operating Guide, (2008)